

**For each question, you need to find the answer and show your work. Each problem is worth 3 points: one for the correct answer and two for showing your work. For some problems, you may just need to write out how you know you have the correct answer.**

1. Simplify.

$$\frac{t^3 \bullet t^5}{t^4 \bullet t^2}$$

2. Simplify.

$$\left( \frac{k^3 \bullet k^5 \bullet k^{-4} \bullet k^7}{k^9 \bullet k^8 \bullet k^{-2} \bullet k^3} \right)^5$$

3. Find the value of  $8^6$ .

4. Estimate  $\sqrt{53}$  to the nearest tenth.

5. Matt Mitarnowski's Mattress Warehouse has 215 people working at the distribution center. If the number of employees doubles every three years for the next fifteen years, how many employees will there be at the end of the 15-year period?

6. The number of bacteria on an unwashed countertop doubles every 20 minutes. If the countertop was used at 7 AM and there are 2000 bacteria at that time, how many bacteria will there be at when it gets cleaned at 1 PM?

7. If  $x^2 = 256$ , what is the value of  $\sqrt{x}$ ?

8. Write  $8.7 \times 10^{-14}$  in standard notation.

9. Write  $3.24 \times 10^9$  in standard notation.

10. The bee hummingbird of Cuba is the world's smallest bird. It weighs approximately 0.056 oz. What is its weight in scientific notation?

11. Solve for  $n$ :  $4.57 \times 10^n = .000000000457$

**Open-Ended Question: Answer the following question on a separate piece of paper. Make sure as you answer the open-ended question that you show your work AND explain how you know you are doing the correct work. YOU MUST EXPLAIN WHAT YOU ARE DOING!!!**

Aside from Australia, the largest island in the world is Greenland, whose approximate area is  $8.4 \times 10^5$  square miles. The next largest island after Greenland is New Guinea, which has an area of approximately  $3.0498 \times 10^5$  square miles.

A. Approximately *how many times larger* than New Guinea is Greenland?

B. What is the *approximate difference in the areas* of the two islands, written in scientific notation?